



## NOC: Defects in Materials

### Course Layout

- Module 1 : Brief introduction to perfect crystals including lattice geometry, point group, space group and crystal structures
- Module 2 : Defect classification in crystalline systems - Point defects in metallic ionic and covalent crystals equilibrium and non-equilibrium defects dislocations, continuum and atomistic theory, dislocations in different lattices, dislocation reactions, interaction and multiplication of dislocations, dislocation sources, glide, cross slip, climb - Stacking faults, twinning - Grain boundaries, small angle and high angle boundaries, special boundaries, ledges, inter-phase boundaries.
- Module 3 : Defect interactions - interaction between point defects and dislocations, interaction between precipitates and dislocations.
- Module 4 : Brief overview of role of defects in controlling optical, electrical, magnetic, semiconducting and superconducting properties of materials.
- Module 5 : Brief introduction to the role of dislocations in static and dynamic strain ageing, work hardening, strength of alloys, deformation of poly-crystals and fracture.
- Module 6 : Brief introduction to techniques for characterization of defects.